

CLAIMS

1. A device for monitoring the flow of a fluid (3, 13) flowing through or from a conduit (2), such as a lubricant or an article treatment fluid, said fluid being a liquid, a gas or containing powder in suspension, said device
5 comprising light-emitting means (1) arranged to irradiate a light radiation towards said flow of fluid (3, 13) and sensor means (4) for said radiation, characterised in that the sensor means are image sensors arranged to sense the image projected onto them by the fluid (3, 13) struck by said light radiation, said image sensor means (4) generating at least one output
10 signal (11, 12) depending on the presence thereon of the sensed flow image, said signal representing in this manner characteristics of the fluid passing through the conduit or emerging from it such as its state of movement or rest, its flow rate or its direction in space.
2. A device as claimed in claim 1, characterised in that the fluid
15 being monitored is an atomized fluid (13).
3. A device as claimed in claim 1, characterised in that the fluid (3) lies between the light-emitting means (1) and the sensor means (4).
4. A device as claimed in claim 1, characterised in that the fluid (13) lies on one side of the light-emitting means (1) and of the sensor
20 means (4), which themselves are located on the same side of the fluid (13).
5. A device as claimed in claim 1, characterised in that the sensor means (4) are a photosensitive element.
6. A device as claimed in claim 1, characterised in that the sensor
25 means (4) are an optical sensor.

7. A device as claimed in claim 6, characterised in that the optical sensor is a PSD.

8. A device as claimed in claim 6, characterised in that the optical sensor is a CCD.

5 9. A device as claimed in claim 1, characterised in that the sensor means (4) are connected to microprocessor evaluation and control means (6) to which the at least one signal emitted by said sensor means is fed.

10 10. A device as claimed in claim 1 or 9, characterised in that the sensor means emit two signals (I1, I2) on the basis of the sensed fluid image.

11. A device as claimed in claim 1 or 9 or 10, characterised in that the signal emitted by the sensor means is an electrical signal.

12. A device as claimed in claim 1 or 9 or 10, characterised in that the signal emitted by the sensor means is a digital signal.

15 13. A device as claimed in claim 9, characterised in that the evaluation and control means (6) are programmable via a programming interface (113) to which these means are connected.

20 14. A device as claimed in claim 9, characterised in that the evaluation and control means (6) are part of an electrical circuit comprising a resetting circuit (96) and an alarm and protection circuit (80).

15. A device as claimed in claim 14, characterised in that the alarm and protection circuit (80) is connected to a connection member (76) for connecting the device to a member receiving the fluid being monitored.

25 16. A method for monitoring the flow of a fluid (3, 13) flowing through or from a conduit (2), such as a lubricant or an article treatment fluid, said method consisting of generating a light radiation which is

directed towards said fluid, and is then sensed after the fluid has interfered with it, characterised by comprising:

a) sensing the image of said fluid generated on image sensor means (4) which are struck by the light radiation directed towards the fluid
5 (3, 13);

b) comparing the sensed image of the fluid with predetermined values to identify characteristics of the fluid such as its state of movement, its state of rest, its flow rate, or its direction in space.

17. A method as claimed in claim 16, characterised in that the fluid
10 image is sensed by reflection of the light radiation which strikes it.

18. A method as claimed in claim 16, characterised in that the fluid image is sensed indirectly via the shadow which it projects onto the image sensor means (4).

19. A method as claimed in claim 16, characterised in that the fluid
15 flow rate is regulated on the basis of the sensed fluid characteristics.

20. A method as claimed in claim 16, characterised in that a member reached by the fluid being monitored is acted upon to regulate its operation on the basis of the characteristics of the sensed fluid.

21. A method as claimed in claim 20, characterised in that said
20 regulating of the operation of the member reached by the fluid being monitored also includes halting said member.

22. A method as claimed in claim 20, characterised in that said regulating of the operation of the member reached by the fluid being monitored includes regulating its spatial attitude.